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ABSTRACT

A study examined the effect that the quality and clarity of the photographic image used in advertising have on the recall of photographic content. It was hypothesized that there will be no significant difference between response rates of high and low signal noise ratio (S/N) photographs, and also that there will be no significant difference between the response rates of visual, visual and aural, or aural attenders. Photographs with high S/N would present the subject clearly with little interference from background or other non-message content. Subjects, 204 communications undergraduates at Syracuse University, viewed sets of two photographs of 24 subjects--one each of high, moderate, and low S/N--and were tested 5 days later to determine the recall rate of the photos. The first hypothesis was rejected, while the second was supported. Results revealed a greater recall rate for high S/N photographs, and also indicated that more high S/N photographs were recalled by aural attenders followed by visual and then aural and visual dominant subjects. Findings suggest that the quality and clarity of a photograph have a positive effect on the recall of the content. Findings also suggest that the character and differences of the individuals comprising the intended audience for the photographs are important and that those traits should be identified and considered before designing photographic material. (Extensive tables of data and figures are included, and references are appended.) (NKA)

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THE EFFECT OF QUALITY AND CLARITY ON THE
RECALL OF PHOTOGRAPHIC ILLUSTRATIONS

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PROBLEM STATEMENT

The purpose of this study is to investigate what effect the quality and clarity of the photographic image have on the recall of photographic content.

Research in photography indicates that, of all the variables affecting response to a photograph, none has been shown to have more importance than content and viewer identification with content.

Of the various variables one can use to judge a photograph such as composition, focus, balance, rhythm, unity, lighting, content, etc.--the content variable stands far out from all the rest. Subject matter orientations have consistently been found to be the main determinants of interest in a photograph (Sanders, 1976, p. 122).

However, in advertising photography the message and content are often predetermined by the client. The advertising illustration photographer is charged with the responsibility of producing photographs with great impact that will be noted and remembered by the target population. To accomplish this, the photographer manipulates the stylistic elements of lighting, image quality, degree of detail, image sharpness, and perspective. The purpose is to produce an image that is, in the jargon of photographers, as clean, sharp, crisp, clear, and simple as the technical limitations of the film and equipment will allow. Is this practice of exercising extreme technical control of the stylistic element of the image truly necessary? Is the expense involved in amassing the equipment and materials capable of producing such high quality images justified? Could images of lesser quality, but with the same content, communicate as effectively?

Some research has focused on the individual stylistic elements. The results have been inconclusive. Tannenbaum and Fosdick (1960), noting the lack of significance in their own study on lighting angle and the difficulty of measuring individual stylistic elements, stated:

We should not be concerned with a single variable but with the interactive effect of several variables operating within the same context. How they blend to influence a single judgment may well be the most significant factor in understanding how photographs are made and how they are read or perceived (p. 261).

Further review of the literature revealed a conceptual framework where the stylistic elements can be grouped together to form an amalgamation or interactive effect consistent with advertising illustration photography conventions. That framework is often designated as signal noise ratio (S/N). S/N has been used in communication theory to describe the degree of clarity of the message over static and background noise (Zakia, 1979). Parallel concepts exist, for example, in art as positive-negative space and figure-ground relationships in psychology.

The S/N concept seems particularly appropriate to the problem at hand. Variations in individual stylistic elements can be described in terms of degree of S/N. Photographs with high S/N would present the subject clearly with little interference from background or other non-message content. Low S/N would present an increased interference from non-message elements and would have a decreased distinction between the message and other elements (Table 1).

The assumption in advertising photography convention is that high S/N photographs will function as "stoppers." The target population will notice

TABLE 1

Description of individual stylistic elements
comprising the concept S/N

Stylistic Elements	High S/N	Low S/N
Lighting	Back lighting, increased feel- ing for depth and enhanced texture, shape	Front lighting, elimination of texture and feel- ing of depth, little detail
Image Quality	Density range of approxi- mately normal contrast	Density range of low contrast, flat appearance
Degree of Detail	High degree of highlight and shadow de- tail	Highlight or shadow areas without detail
Image Sharpness	Whole image area critical- ly sharp	Generally not critically sharp, one plane of sharpness
Perspective	Focal length and image size appropriate for the subject	Introduction of subject dis- tortion, too much background or foreground area

these photographs from all other visual material presented. Thus the viewer will be more likely to remember the photograph, and hopefully the message, given the increased attention to it. Advertising research has centered on this concept and almost exclusively uses long-term and short-term recall testing as one of the primary measures of advertising effectiveness.¹

In this study, as well as any investigation into communications, it is important to consider more than just the media being employed. The target audience and the differences of the individuals comprising that audience have consistently been shown to have great impact on the effectiveness of messages.

The individual difference perspective implies that media messages contain particular stimulus attributes that have differential interaction with personality characteristics of audience members. Since there are individual differences in personality characteristics among such members, it is natural to assume that there will be variations in effect which correspond to these individual differences (DeFleur and Rokeach, 1982, p. 188).

Research has shown that some individuals recall more information when it is presented visually. Conversely, aural attenders tend to recall more information when it is presented aurally. Others show no preference for either the visual or aural modality (Ingersoll and DiVesta, 1972). Given that this study proposes to investigate the recall of photographs, it seems appropriate that an effort be made to identify which of the subjects are visual, aural or both aural and visual attenders.

¹The profits of Burke Marketing Service, one of the largest but by no means the only organization involved in recall testing, was over \$60 million in 1983. Advertising Age, May 17, 1984.

This study will attempt to answer two specific questions:

- Do subjects recall photographs with high S/N more than photographs with low S/N when the message is held constant?

Null Hypothesis 1: There will be no significant difference between response rates of high and low S/N photographs.

- Do individuals who are visually dominant recall more high S/N photographs than individuals who are both visual and aural or aural attenders?

Null Hypothesis 2: There will be no significant difference between the response rates of visual, visual and aural or aural attenders.

A secondary purpose of this study is the development of procedures for the classification of stylistic elements of photography. To accomplish this goal, written and photographic examples of stylistic elements must be produced. Further, this study will develop a methodology for the investigation of the effects of stylistic elements of photography. This procedure may be used in future research.

METHODS

Due to the complexity of isolating the various quality levels of photographic images and at the same time controlling for the content of the photograph, an experimental design was chosen for this study. Student subjects were shown photographs representing high and low signal noise ratio. Five days later, a post test was used to determine the recall rate of the photographs. Demographic information about each subject was also collected. In addition, a modality preference test was used to classify the subjects according to their preferred information gathering modality--aural, visual, or both aural and visual.

Subjects

The subjects for this study were 204 (112 female and 92 male) students enrolled in four sections of a first year survey communications course at the S. I. Newhouse School of Public Communications, Syracuse University. No grade or payment was given for participation in the study.

Setting

The experimental setting was the students' regular lecture room and a nearly identical adjacent lecture room. The experiments were conducted during the subjects' normal class time. Both lecture rooms are equipped with front projection screens, a projection booth and audio systems. The same setting was used throughout the experiment.

Photo Illustration Materials

For the experiment, sets of two--one each high, moderate and low S/N

photographs of 24 subjects--were produced. The subjects of the photographs were studio table top photo illustrations of agricultural produce for a fictitious advertising campaign for the California Agriculture Board.

Photographic Subject. Produce was chosen for the subject of the photography because it offered many advantages for the basic design of the study. One major concern was that the content of the photograph might produce a greater impression than the quality of the image. It was therefore necessary to choose a subject category that would produce little emotional involvement. Another concern was locating 24 different subjects in one category that could be easily identified in the final photographs. Availability and cost of the subjects for the photo illustrations was an additional factor. The actual photography for the study took place in late summer when supermarket produce departments were brimming with good subjects. Finally, agricultural produce is an exceptional photographic subject offering a variety of shapes, colors and textures without the difficulty of surfaces that complicate studio lighting.

Film Materials. In order to illustrate the concept S/N, a standard procedure was established for the photography. All subjects were photographed in 35 mm Ektachrome 160T color transparency using a Canon AE1 system with 28 mm, 50 mm and 100 mm lenses. In addition, each subject was also photographed on Polaroid 669 film to provide a visual record of each photo set and lighting, and Vericolor II L120. A Hasselblad 500 ELM and 500 CM with 50 mm, 80 mm and 150 mm lenses were used for the Polaroid and color negative photography.

Stylistic Elements. Lighting, image quality, degree of detail, image sharpness and perspective were the stylistic elements manipulated to provide the different levels of S/N necessary for the experimental materials. In general, the same procedure was used for each of the two levels of signal noise ratio.

Lighting. All the studio lamps were powered by a Norman 900 series 2000WS power supply. However, only the 250W quartz modeling light was used for the photography. This made exposure adjustments between different types of film easier to accomplish than would be possible with strobe light.

Low S/N photographs were illuminated by a Norman lamphead with a seven-inch non-diffused polished reflector located directly above the camera lens at a 30 degree angle to the subject (Figure 1.1).

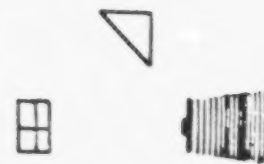
High S/N photographs were made with either top back 45 degree scrim and lamphead with 7-inch reflector or a 31"x31" Hensel bank light placed above and behind the subject. Reflector fill cards were placed in front of the subject to illuminate shadows and reduce the contrast range (Figure 1.2).

Image Quality. Image quality is the visual contrast range from the darkest to lightest values in the color transparency. The image quality was controlled by the size, type and direction of the light source used as well as the use of reflectors. Low S/N photographs were of a low contrast range and appeared flat. In general, high S/N photographs were of a normal contrast range and had a normal appearance.

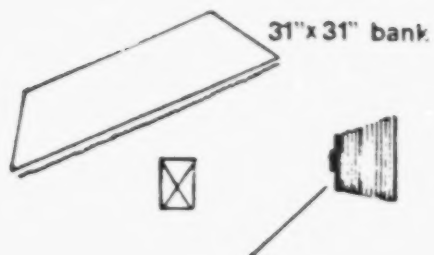
1.1 Low Signal Noise Ratio:
Side View



Top View



1.2 High Signal Noise Ratio:
Side View



Top View

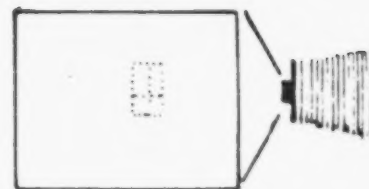


Figure 1. Lighting diagrams for low and high signal noise ratio photographs.

Degree of Detail. During the photography of the produce, a series of exposures were made of each subject at 1/2 f. This produced a range from under, to normal, to over exposure. The choice of the exposures of the transparency provided for a precise selection of the degree of detail appropriate for each level of S/N. Generally, low S/N subjects were over exposed, reducing the detail in the highlight areas. High S/N photographs were of normal exposure with good detail in both the shadow and highlight areas.

Image Sharpness. Depth of field, controlled by the lens aperture, was used to manipulate image sharpness. Low S/N photographs were made at the widest possible lens aperture, resulting in one plane of critical sharpness and a narrow depth of field. This effect was sometimes diminished by the use of a wide angle lens. High S/N photographs used maximum depth of field, which resulted in acceptable sharpness of the whole image area.

Perspective. Some manipulation of perspective was accomplished by the selection of the focal length of lenses and the relative distance of the camera to the subject. Low S/N introduced subject distortion by the use of a wide angle lens. High S/N subjects were photographed with a short telephoto lens.

The results of the manipulation of the stylistic elements were a series of 25 sets of photographs suitable for the experimental design. The low S/N photographs represented the minimum acceptable level of quality. High S/N photographs were generally examples of high stylistic execution.

Modality Preference Test Materials

The Modality Preference Test was based on a bisensory missing unit task (Ingersoll and DiVesta, 1972). For this study, a modified version was used to indicate the subjects' modality preference (DiVesta, 1985). Words for the visual and audio stimuli were selected randomly from the Thorndike and Lorge list of the 500 most common words (Thorndike and Lorge, 1944). Homophones, proper nouns and numbers were eliminated.

Two independent sets of example, practice and test materials, one set for the audio modality and one set for the visual modality, were produced. For the visual stimulus test arrays, 35 mm transparencies were made of a typed word list. The audio stimulus and test arrays were recorded from a different list of words by a professional announcer. The same tape was later encoded with inaudible cues that controlled the presentation of the Modality Preference Test. A stimulus array consisted of seven words presented sequentially. A test array was a sequence of six of the seven words. The missing word was determined randomly. Additional slides and audio recordings were made for example and practice items.

Procedure for the Modality Preference Test

The subjects were first presented two examples and four practice items using the same format described below. For each test item, a stimulus array was presented followed by a test array. The subjects' task was to determine the missing word and record it on the response form provided. The procedure was repeated for a total of ten test items, five for each modality. The order of the aural or visual testing was determined

randomly. The 54 subjects who recalled more visually presented missing words were classified as visual attenders. Thirty subjects responded correctly to more aural missing words and were classified as aural attenders. The 120 subjects who responded equally to aural and visual missing words were classified as both aural and visual attenders.

Professional Jury

The completed photo illustration slide sets were presented simultaneously side by side to a jury of five professional advertising illustration photographers. Each juror was given a written description of the individual stylistic elements in terms of the concept S/N and asked to classify the photographs according to their interpretation of high and low S/N. An interrater reliability of .80 (agreement by four out of five jurors with each other and with the original classification) was necessary for a photograph to be used in the study. Because of scheduling difficulties, it was necessary to present the photographs to the jurors in three separate groups. The first and second groups had two jurors each. There was one juror in the third group. No interaction between the jurors or the investigator took place during the classification process. Five undergraduate students, from a section of the class not used in the study, were asked to classify the photographic illustrations using the same criteria and method as the professional jury. The student jury classification took place in one group. Again, there was no interaction between the student jurors or the investigator during the classification process. The student jury responses were similar to the professional

jury's selection (Table 2).

The initial design for this study called for a total of 18 sets of photographs. This would provide for six each high, moderate and low possible responses. Twenty-two photographs evaluated by the professional photographer jury met the established criteria. Of these, 18 sets were selected by the investigator for use in the pilot studies and final experiment.

The selected slides were randomly assigned positions in two slide trays so that the sequence of slides was identical in each tray. The slides were also randomized to provide an equal distribution of high and low S/N sides to each tray. Each subject group was presented one of the two slide trays (Table 3).

Apparatus

Instructions for the experiment as well as the audio segments of the Modality Preference Test were provided via audio tape played on a Wollensak slide/tape synchronization unit. This device controlled the presentation of slides at the appropriate moment by inaudible cues on the audio tape that advanced the slide projector. A professional announcer was used for all voice recordings.

The high and low S/N photographs portion of the advertising campaign was shown at a rate of one slide every six seconds. This rate is used in advertising research and is considered the normal viewing time for print advertisement (Weinblat, 1985).

TABLE 2

Subject of photographs and rate of
professional and student juror agreement

Subject of Photographs	Professional Photographer Jury	Student Jury
Blueberry	1.00	.40
Pea	1.00	.80
Green Onion*	.40	.20
Carrot	1.00	.80
Potato	.80	.60
Lettuce	1.00	.40
Onion**	.80	.60
Apple	.80	.80
Grape	.80	.60
Melon**	1.00	.40
Banana*	.60	.00
Cucumber	1.00	.80
Mushroom	.80	.60
Strawberry	1.00	.80
Lemon	1.00	.40
Beans*	.60	.80
Celery	1.00	.80
Peppers	1.00	.60
Cabbage	1.00	.60
Garlic	1.00	.60
Radish	1.00	.00
Parsley**	1.00	.60
Peach	.80	.40
Watermelon**	.80	.00
Corn	1.00	.40

*Slides eliminated by professional photographer jury.

**Slides eliminated by author.

TABLE 3

Distribution of slides to trays for final study

Subject	Tray A	Tray B
Blueberry	L	H
Pea	L	H
Carrot	H	L
Potato	H	L
Lettuce	L	H
Apple	H	L
Pepper	H	L
Cucumber	H	L
Mushroom	L	H
Strawberry	L	H
Lemon	L	H
Celery	H	L
Grape	L	H
Cabbage	H	L
Garlic	L	H
Radish	H	L
Peach	L	H
Corn	H	L

H = High S/N photographs
L = Low S/N photographs

Subjects in four sections of the Spring 1986 semester freshman survey communications class were used. Each class group was randomly divided by coin toss into two cells. One cell remained in their normal lecture room while the other cell moved next door to a nearly identical lecture room. The subjects in both cells were presented the experiment by automatic slide tape equipment. All instructions were presented by audio tape. With the exception of the distribution of the response forms, the subjects had no contact with the experimenter after the beginning of the study.

The slide tape instructed the subjects to record the date, time, the last four digits of their social security number and the letter projected on the screen on the cover of the response booklet. The letters--A for one, B for the other, were used so that the response booklets would be properly coded for later data processing. The subjects were then informed of their task to evaluate an advertising campaign. Information was given about the client, target population, length of campaign and media to be used. A slide copy of the layout was shown. The high and low S/N photographs were then presented at the six-second interval. The modality preference test was then given, followed by a one-page questionnaire. The questionnaire asked about the campaign and requested the subjects' prediction of the campaign's success. This information was not used in the study. Finally, one page of demographic information was collected.

Five days later, the subjects were again asked to record the time, date, the last four digits of their social security number and the letter of the group they were previously assigned on a one-page response form. A

request was then made of the subjects to write the names of as many photographs (i.e., the actual name of the produce) as they could remember from the advertising campaign they viewed five days prior.

With one exception, the conduct of the experiments went well. One-half set of data were lost due to an equipment malfunction in one group.

FINDINGS

A total of 204 student subjects--92 men, 112 women--took part in the study. The mean age of the subjects was 18.64 years (Table 4). The subjects averaged 1.33 years of college experience. Seven subjects reported experiences in media. Of these, only two subjects noted significant or professional experience in communications, art, graphic arts, film, advertising or photography. No one reported color blindness, not an unlikely occurrence since only two percent of the male and .03 percent of the female population are affected by the disorder (Kodak, 1966).

Analysis of Treatment by Group and Cell

The subjects were asked to list the content of as many of the 18 photographs as they could recall. Each subject's responses were scored according to the number of correct high and low S/N photographs identified. The 204 subjects recalled a total of 1362 correct responses. Of these, 712 were high S/N and 650 were low S/N with mean scores of 3.44 and 3.17 respectively (Table 5).

There is an indication from the report of means (Table 5) that a pattern may exist between the high and low treatments. Without exception, in each group and cell, high S/N photographs had an equal or greater recall rate than low S/N photographs. A plot of high low and A and B means for each group clearly reveals this pattern (Figure 2).

TABLE 4

Student subject demographic information by group and cell

Group	Cell	No. of Subjects	Age		Sex	
			$\bar{X}$	S.D.	M	F
1	A	33	19.00	1.06	15	18
	B	19	18.28	1.06	10	9
2	A	39	18.43	.50	17	22
	B	23	18.65	.88	11	12
3	A ^a					
	B	32	18.62	.79	14	18
4	A	27	18.51	.80	9	18
	B	31	18.51	.76	16	15
Total		204	18.64	.83	92	112

^aGroup 3 data not available due to equipment malfunction.

TABLE 5
Means and standard deviation of high and low S/N
responses by group and cell

Group	n	Means		Standard Deviation	
		H	L	H	L
1	A 33	2.42	2.42	1.65	1.65
	B 19	2.95	2.79	1.54	1.35
2	A 39	4.23	3.33	1.84	1.19
	B 23	3.09	3.04	1.37	1.18
3	A *				
	B 32	3.63	3.37	1.84	2.01
4	A 27	4.22	3.85	1.86	1.43
	B 31	3.55	3.39	1.56	1.45

*Group 3A data not available due to equipment malfunction

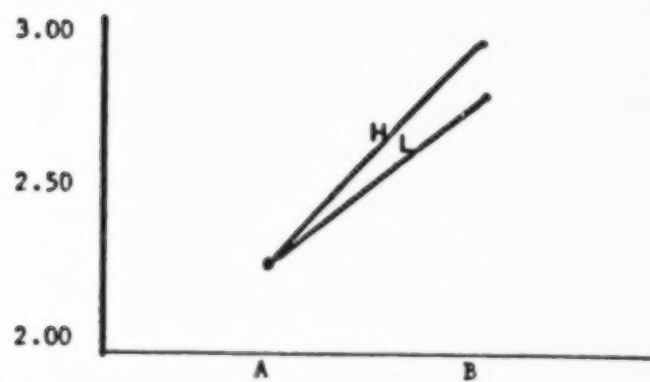


Figure 2.1 Plot of high S/N vs. low S/N for Group 1

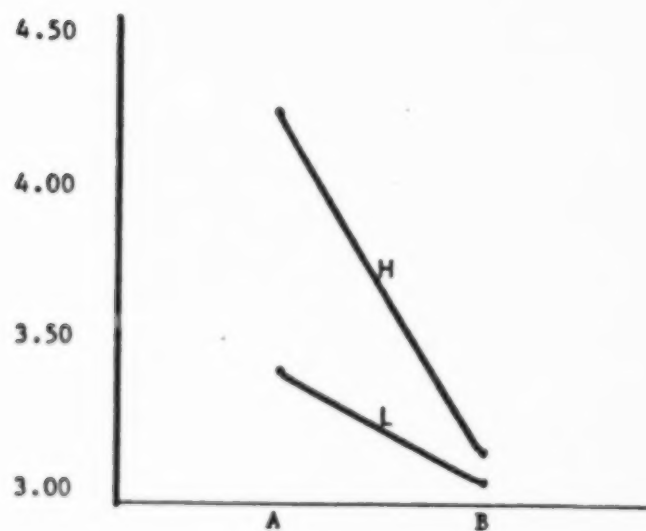


Figure 2.2 Plot of high S/N vs. low S/N for Group 2

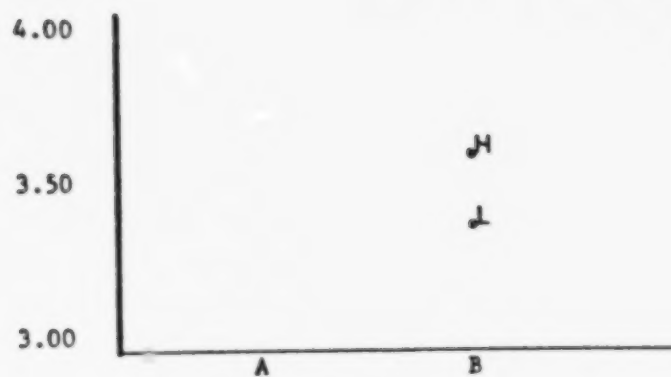


Figure 2.3 Data points for high S/N vs. low S/N for Group 3
(A data not available due to equipment malfunction)

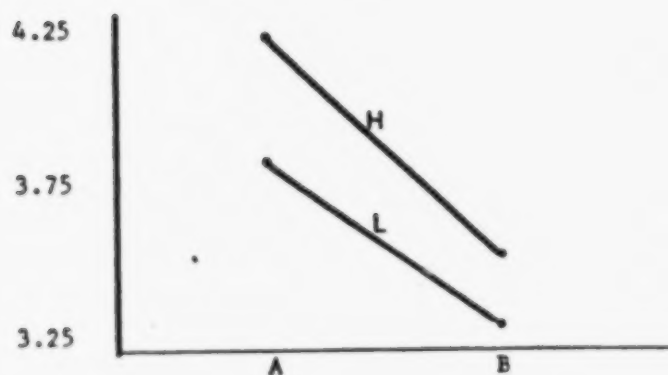


Figure 2.4 Plot of high S/N vs. low S/N for Group 4

An analysis of variance for repeated measures was used to analyze each group and cell. Looking at the groups individually, no significance was found (Table 6).

A rationale exists for combining the groups into one set of data for analysis. The media under study are not time specific, as television or radio would be. Print media are available to the viewer at all times. Studying the results across time is therefore justified.

A repeated measures analysis of variance was used to study all the groups across time. The repeated measure factor was S/N. Results showed a significant effect due to treatment $F(1,197) = 4.86, p > .0286$. The first research hypothesis was therefore supported. There was no significant group x treatment interaction $F(1,197) = 1.09, p > .2980$ (Figure 3).

Analysis of Treatment by Modality Preference Classification

High and low S/N response data were assembled according to the subject modality preference classification. Subjects who responded correctly to more test items presented orally were classified as aural. The aural-visual classification had an equal number of correct responses to aural and visual stimuli. The visual classification was given to those who selected more test items in the visual modality (Table 7).

Further study was conducted using a repeated measures analysis of variance. There was a significant effect due to treatment $F(1,192) = 7.28, p > .0076$. There was no aural, aural visual, visual x treatment interaction $F(2,192) = 1.69, p > .1882$. Observation of the plot of H vs. L S/N treatment by modality preference classification across time reveals a

TABLE 6
Repeated measures analysis of variance.
group by treatment

Group	df	df Error	F	p
1	1	50	.14	.713
2	1	60	3.69	.059
3 ^a	1	31	.54	.466
4	1	56	.97	.329

^aAnalysis based on B cell data set

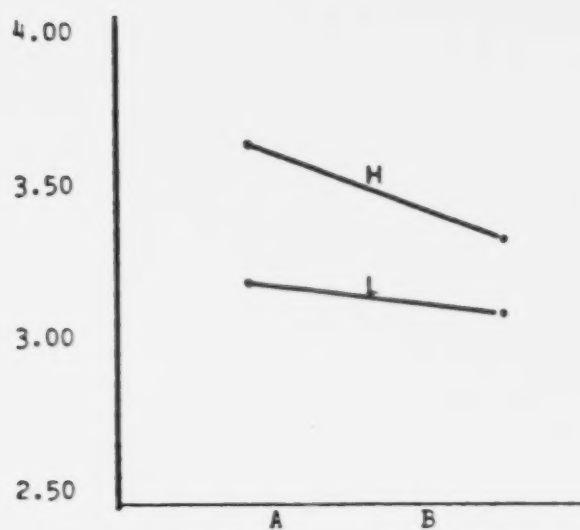


Figure 3 . Plot of high vs. low treatment by groups across time
 $n = 204$, Treatment: $F(1,197) = 4.86$, $p > .0286$
Group x Treatment: $F(1,197) = 1.09$, $p > .2980$

TABLE 7

Means and standard deviation for treatment
by modality preference classification

Group	n	High S/N		Low S/N	
		$\bar{X}$	S.D.	$\bar{X}$	S.D.
A	30	3.87	1.16	3.02	1.19
AV	120	3.19	1.67	3.10	1.36
V	54	3.39	1.68	3.15	1.46

result that was not consistent with the research hypothesis. Although more high S/N photographs were recalled by the aural, aural visual and visual classifications, it was predicted that the highest recall rate would be by visual attenders followed by aural visual and then aural attenders (Figure 4). The second hypothesis is therefore rejected.

Analysis of the Content of the Photographs

Comparing the mean of all A cells to the mean of all B cells across time, it was found that they were not equal ($t = 2.24$ $p > .0125$). This suggests that some factor was in operation resulting in a difference between the A and B cells. It was assumed that the content of the photographs was identical in every respect except S/N. Given this difference, it seemed appropriate to attempt to determine what other factor may be operating that may affect the subjects' responses. One likely possibility was that the photographs were not equal in terms of the number of responses they received. An analysis of variance was conducted on the response rate to each photograph. Results revealed a significantly different response rate to some of the photographs $F(17.54) = 3.55$, $p > .002$ (Table 8).

One possible explanation was that a disproportionate number of photographs receiving a high response rate were presented in the A cell slide set. A study of the photographs arranged according to their response rate did not reveal a pattern (Table 9).

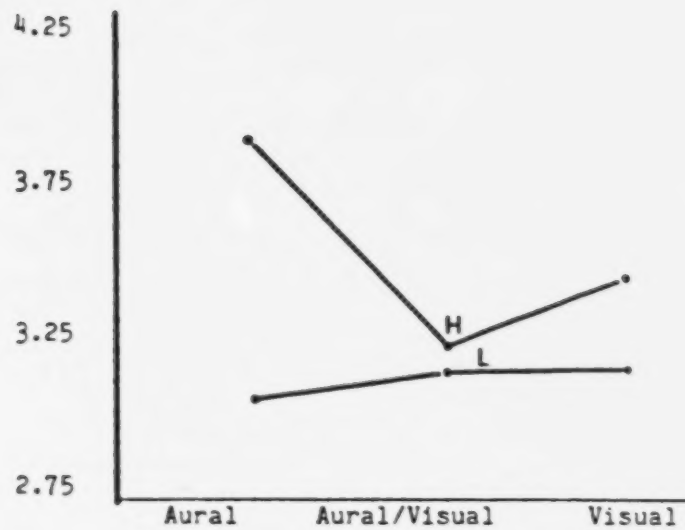


Figure 4. Plot of H vs. L S/N treatment by modality preference classification across time
 $n = 204$ Treatment $F(2,192) = 7.28$, $p > .0076$
MPT x Treatment $F(2,192) = 1.69$, $p > .1882$

TABLE 8
Response rate of photographs by S/N and cell

Subject	Cell		# H Responses	# L Responses	Total # Responses
	A	B			
<u>Highest Response</u>					
Lettuce	L	H	62	59	121
Carrot	H	L	57	63	120
Apple	H	L	61	54	115
Grape	L	H	58	51	109
Strawberry	L	H	58	46	104
<u>Moderate Response</u>					
Radish	H	L	44	37	81
Pea	L	H	37	39	76
Cabbage	H	L	41	35	76
Blueberry	L	H	40	34	74
Mushroom	L	H	36	37	73
Celery	H	L	35	35	70
Cucumber	H	L	34	32	66
Corn	H	L	33	29	62
<u>Lowest Response</u>					
Pepper	H	L	29	24	53
Potato	H	L	25	27	52
Garlic	L	H	19	20	39
Peach	L	H	29	10	39
Lemon	L	H	14	18	32

TABLE 9
Multiple range test for content of photographs

Grouping	Mean	Content of Photograph
A	30.250	lettuce
A	30.000	carrot
A B	28.750	apple
A B C	27.250	grape
A B C	26.000	strawberry
A B C D	20.250	radish
A B C D	19.000	pea
A B C D	19.000	cabbage
A B C D	18.500	blueberry
A B C D	18.250	mushroom
A B C D	17.500	celery
B C D	16.500	cucumber
B C D	15.500	corn
C D	13.250	pepper
D	13.000	potato
D	9.750	garlic
D	9.750	peach
D	8.000	lemon

Means with the same letter grouping are not significantly different.

Summary

The first null hypothesis predicted that there would be no significant difference between the response rates of high and low S/N photographs. Results revealed a greater recall rate for high S/N photographs. The first null hypothesis was therefore rejected.

The prediction of the second null hypothesis was that there would be no significant difference in the response rate of visual, aural, and both aural and visual attenders. The second null hypothesis was therefore not rejected.

It was anticipated that visually dominant subjects would recall more high S/N photographs than aural or aural and visual attenders. The results revealed that more high S/N photographs were recalled by aural attenders followed by visual and then aural and visual dominant subjects.

Discussion of Results

The results of this study show that the combined effect of high quality and high clarity increases the recall of photographic illustrations. The 204 subjects that participated in this study recalled approximately 6.5 of the 18 photographs presented. Of these, slightly more than one-sixth, 3.44 on average, were high S/N photographs. Slightly less than one-sixth, 3.17 on average, were low S/N photographs. A careful interpretation of the data would indicate a cautious approach to generalizing this information. It is dangerous to assume that a high S/N photographic illustration by itself will be capable of greater recall than a photograph of lower S/N. In this study, the content of the photographs

was carefully controlled. In actual communication situations, the effects of content will undoubtedly have a powerful influence on the notice and read of competing photographic illustrations regardless of the quality of the image. Keeping that in mind, it is recommended that any reasonable measure that will enhance the S/N of a photographic illustration, or photographic system, should be exercised.

The results of the modality preference portion of the study served to highlight the importance of the individual. Although all modality preference classifications--aural, aural-visual, visual--recalled more high than low S/N photographs, there are notable differences in the response rates of the individual modality preferences. It was predicted that the subjects classified as visual attenders would have a higher recall rate of high S/N photographs than subjects classified as aural or both aural and visual attenders. This was not supported by the data. In fact, aural attenders had the greatest high S/N recall rate. One possible explanation is that subjects classified as aural normally do not attend to visual information in the same manner as visually dominant individuals. They therefore may be more attentive to visual stimuli when visual stimuli are provided and they are directed to view them. Modality preference classification was found not to be an accurate predictor of performance when higher order tasks are involved (DiVesta, 1985). This may also explain why the recall rate for visual attenders was not greater than aural or both aural and visual attenders. Undoubtedly, the characteristics of

the individuals comprising the intended audience of the photographic illustrations should be taken into account.

In this study, subjects were divided into A and B cells. Both the A and B groups behaved in a similar manner without group treatment interaction. However, examination of the plot of high vs. low S/N treatment across time (Figure 3) reveals that the A cell had a higher response rate than the B cell. The difference between the two cells was significant. This suggests that there may have been a difference between the two groups in treatment or in the conduct of the experiments. Data were generated that identified the photographs according to the degree of difference (Tables 8, 9). No pattern was detected that would explain the different levels of response by the two groups. One possible explanation is that in three of the four experiments, the B group was moved to the adjacent lecture room. However, in the one case when the A group moved, the pattern of responses did not change. Another possibility may have been the psychological effect of the response form coding system. The A group was instructed to write the letter A on their response forms. The B group was asked to write the letter B. It is not unreasonable to suggest that the A group may have performed better and/or the B group worse because of the connotation associated with the letters. This may be especially true since the subjects were students.

The photographs used in this study were presented by projection in a darkened room. The setting was a large lecture room with a number of people viewing the same material at the same time. The eighteen slides

were presented sequentially. These factors must be taken into account before conclusions can be drawn from this study. How the quality of photographs affects recall of content in advertisements, magazines, newspapers and books still needs to be investigated.

Conclusions for Practitioners

The results of this study suggest some clear conclusions for practitioners of photography.

1. The quality and clarity of a photograph have a positive effect on the recall of the content of a photograph. Whenever possible, all reasonable efforts should be made to improve quality.
2. The character and differences of the individuals comprising the intended audience of the photographs are important and those traits should be identified and considered before designing photographic material.

A Look Into the Future

Photography is currently experiencing some of the most significant technological changes since its inception 147 years ago. Today, on line in printing plants all around the world is computerized image processing equipment. In systems such as the Sytex and Crossfield, photographs are scanned and stored in digitized form. The digital information can be processed by computer, performing improvements and changes in seconds that just a few years ago would have taken days to accomplish. At the flip of a switch, lasers print color separations in seconds, eliminating a time consuming and costly photographic process. The same digitized photographic

information can be transmitted instantly anywhere in the world by fiber optic cable and satellite. Currently, this technology requires substantial investment. However, major corporations such as Eastman Kodak, Xerox, Polaroid, Sony and Canon are working on similar systems for the professional and amateur photographic market. These new systems, coupled with desk top computers, can make high quality publishing possible at a fraction of the current cost. These and other new technologies offer the promise of the use of more photographs, resulting in a barrage of visual information.

Despite the new technology, the photographic message still remains the result of the combined knowledge, skill and experience of the photographer. Ultimately, it is the design and execution of the photographic message that communicates information. If effective photographic messages are to exist, then a clear understanding of the underlying principles of how a photograph communicates will become increasingly important. This presents an intriguing challenge.

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